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Refinishing Old Furniture

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Refinishing Old Furniture

NATURAL FINISHES

FLORENCE E. WRIGHT

THE lure of the antique in recent years has developed an interest in refinishing methods for the amateur. Many families are fortunate to have furniture that has come down to them through many generations along with tales of the former owners and their adventures. Others, less fortunate, still find satisfaction in adding old pieces that give interest and character to their homes. They have had the fun of hauling forgotten treasures from their own or their friends' attics, and becoming auction and antique-shop hounds, stopping at every secondhand store and at the shop of every antique dealer along the way and attending shows for miles around.

Much old furniture needs to be refinished. Perhaps there is no greater thrill for the lover of antiques than that which comes when the hidden beauty of the wood beneath the many layers of varnish and paint is first uncovered and then is developed by the new finish. *The original finish of valuable pieces, if it is in good condition, must not be touched, for the value would be largely destroyed.*

Old wood furniture that has beautiful color and grain usually is finished to show its natural beauty. Such pieces as the Windsors, the Sheraton "fancy" chairs, as well as most of the Hitchcock type of chairs and the Boston rockers, were made of wood that was intended to be covered with paint, although some of these painted rockers had arms with natural finish, and rockers of cherry or apple wood also were left in that finish (figure 1).

Part of the charm of old furniture is in the signs of age and usage that call to mind the people and the social customs of other days. Therefore, in refinishing old furniture do not try to have the pieces look new. If they do not disfigure the piece, leave some signs of age, such as traces of paint, the marks of the cabinetmaker, and signs of wear that come naturally with use through the years. The certainty that a piece is an antique, and hence

its commercial value, often rests on these marks. Many old pieces of furniture need only to be cleaned, and this should be your first step if a finish is still on the wood.

Before deciding to do your own refinishing, take stock of yourself to be sure you have enough patience and perseverance to complete the work satisfactorily. There is no short cut to a good refinishing job, so you must be willing to work many hours, and to see that you do each step well before you begin another. Failure to do this always ends in difficulties that take more time and patience to correct than if you had done more careful work in the beginning.

Figure 1. Chairs that were originally painted and decorated were usually made of several kinds of wood and should, therefore, be restored with paint, not by natural finishes. Rocker arms were often left in the natural finish if of cherry or maple. The fiddle-back type chairs would be in a natural finish if made of curly maple or mahogany.

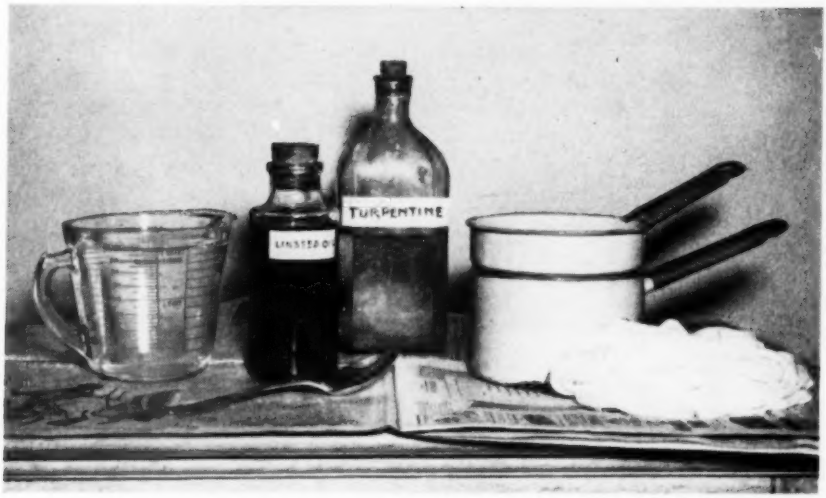

Figure 2. Equipment for cleaning varnished woods includes a double boiler to keep the liquid hot.

To Clean Furniture

General Cleaning

A good solution for washing varnished furniture at housecleaning time, and for cleaning old furniture that has been neglected is: 1 quart of hot water, 1 tablespoonful of turpentine, and 3 tablespoonfuls of boiled linseed oil (figure 2). The turpentine helps to cut the dirt, and the oil lubricates, feeds, and polishes the wood. Keep this mixture hot in a double boiler while using. First, rub the wood with a soft cloth wet with the solution, then polish it with a dry cloth. Use the solution on only one section of the piece at a time. If desired, use furniture polish or wax after this cleaning.

To Clean Badly Soiled Pieces and to Remove White Spots

Some pieces may need additional treatment to remove all of the old dirt, or to remove white spots. Some form of friction must then be used with oil (linseed oil, mineral oil, or machine oil) to lubricate and to prevent scratching the wood. For friction, use very fine steel wool or pumice powder or both. Keep the wool or powder wet with the oil as you rub it over the surface with a cloth or felt pad, or with the pads of the hand. On carvings, use an old toothbrush or nail brush to remove the dirt from deep crevices. Thoroughly remove all traces of the oil and pumice or steel particles with soft dry cloths until no finger marks show.

Figure 3. Equipment for removing the old finish.

To Clean Waxed Furniture

Remove the dirt and wax with a cloth dampened with turpentine. The piece may then be re-waxed. If the wood is dark, the wax should be colored (page 29).

Preparation for Finishes

THE main steps in refinishing are: the removal of the old finish, the preparation for the new finish, and the application of the new finish. Before starting work, remove the handles, knobs, and hinges of table leaves and doors to make the finishing of parts easier.

Remove the Old Finish

Equipment and method

Equipment. A good grade of paint and varnish remover; an old can or dish for varnish remover; a brush; a putty knife; a piece of burlap; steel wool (medium); denatured alcohol; soft rags without lint; rubber gloves; a smock; and papers to cover the floor and table (figure 3).

Method. A good grade of varnish remover is the safest material for removing the old finish. Lye is a dangerous remover as it may burn and roughen the wood; also, it may injure the new finish, for it is impossible to get the lye out entirely. A piece of glass or a scraper in the hands of an amateur may injure the surface of the wood, which you want to preserve if possible.

For the majority of pieces, paint and varnish remover will cut the old finish. Apply the remover generously with a paint brush to a small area

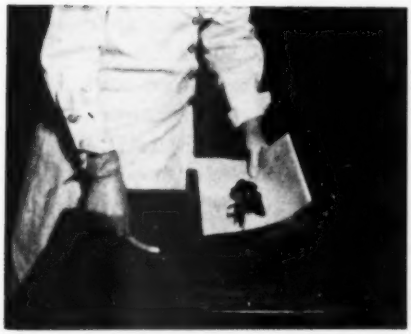

Figure 4. When removing the old finish, hold the knife flat against the wood and lift the finish off. Take care not to scratch the wood.

Figure 5. Use burlap to remove the finish from turnings.

at a time and allow it to stand until the finish has softened enough to be lifted off with a dull-edged putty knife (figure 4).

Some removers work more quickly than others, and some finishes are more easily affected by the remover than are others. Try the remover first on a small section to find how fast you can work. Try to remove all the finish at once to save time in the long run. If the remover dries before the finish is soft, apply another coat right over the first. Put on the remover in one direction, with a full brush, not brushing back and forth if it contains wax; wax forms a film over the surface to keep the liquid from drying out. If the remover runs down onto another section, wipe it off immediately: it will stain the wood if it is allowed to stand. Keep applying the remover at intervals until the paint has softened.

Use an old tooth brush, a sharpened lollipop stick, an orange stick, or a meat skewer to clean carvings. On turnings and curved surfaces, use a piece of burlap or crumpled paper to remove the first layer, and steel wool to remove the last (figure 5). A thread of the burlap or a piece of steel wool twisted into a narrow strip is helpful in removing the finish from the fine grooves (figure 6).

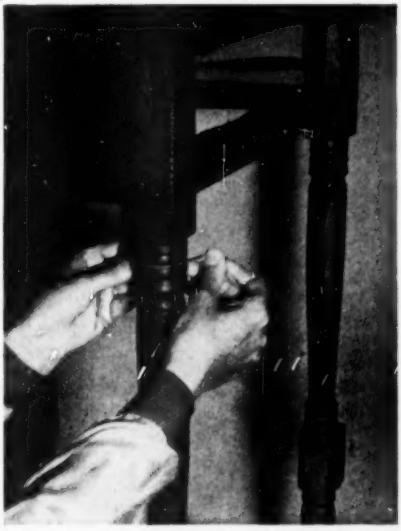

Figure 6. Clean out crevices by rubbing a thread of burlap back and forth.

Figure 7. Remove the last traces of the old finish by rubbing with a cloth moistened with denatured alcohol. This also counteracts the effect of the varnish remover.

When all the finish is removed from any part, thoroughly clean off all traces of the remover with denatured alcohol or turpentine, as suggested on the can (figure 7). If there are any shiny spots or places from which a light powder can be scraped, some of the old finish is still present. All of the remover *must* be cleaned off or the new finish will not dry.

On many old pieces, usually on those made of pine, the wood has been covered with a penetrating red paint which was made by mixing red pigment with skim milk or buttermilk. In the old days, this paint was considered desirable because it thoroughly covered all knots and imperfections and gave an effect somewhat like that of the richer woods of mahogany and cherry. Varnish remover will not remove this paint. The surface must be kept moist with denatured alcohol and rubbed with sand paper or steel wool. If the paint has penetrated deeply into soft wood, it is impossible to remove all of the color. Some slight indication of the original color need not disturb you, because a collector of antiques would find this a sign of age. In fact, such traces add interest by giving a variation in color where more of them are left, for example, around the turnings.

Prepare for the New Finish

By careful workmanship throughout, you can develop a piece of furniture of great beauty. The final finish depends for its beauty upon the

Figure 8. Equipment for removing dark spots.

preparation of the wood for this finish. It is important to spend plenty of time on each step.

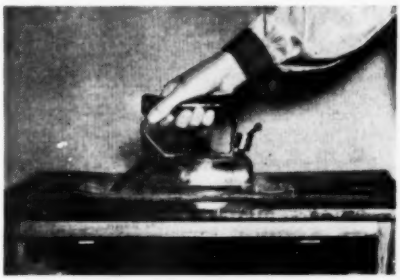

Figure 9. Remove dents with steam.

Equipment

To prepare the wood for the new finish you need:

For new wood: A damp cloth.

For dark spots: A saturated solution of oxalic acid (1 ounce of powdered oxalic acid or 2 ounces of crystals of oxalic acid to 1 pint of hot water), and a weak solution of ammonia (1 tablespoonful to a quart of water). Some woods, particularly maple, may need a saturated solution of ½ oxalic acid and ½ tartaric acid (figure 8).

For dents and bruises (not for veneer): A hot iron and a damp woolen cloth (figure 9).

For removing warp: Moisture such as steam or wet sawdust; clamps.

For gluing: A plastic resin-type of glue; a mallet, or rubber tip for a hammer; hot vinegar to soften old glue that does not chip off easily; strips of cloth for padding in loose joints; sandbags for curved surfaces; a flat board to use over a sandbag; rope of the size needed, from clothesline for large pieces to a heavy fishline for small ones; spikes, or 6-inch sticks for tourniquets; clamps of the size needed; newspaper for pads under a rope or clamp; a jackknife to scrape off old glue.

For repairing larger areas: Old wood of the same color, pattern, and texture as the piece.

For filling small holes: One or more pieces of shellac stick to match the color of the wood; an electric soldering iron, or an old steel knife and heat; commercial wood putty; a sharp penknife or razor blade.

For sanding: For dry sanding, assorted sizes of garnet finishing paper, or for general use, sizes ½, 2/0, and 6/0; assorted sizes of emery cloth; for wet sanding on varnish, silicon carbide, waterproof paper Series A. Sizes run from 240-A to 700-A, but for most work 360-A is of a good size and for fine work, 500-A. For rubbing the last coat, refer to page 26.

To prepare new woods

Furniture that is purchased unfinished should first be wiped with a cloth dampened in water, then allowed to dry. The dampness raises the grain, which should be sanded thoroughly before the stain or a finish is applied.

To remove dark spots and to freshen wood

Dark spots usually may be removed by bleaching them with a saturated solution of oxalic acid or a combination of oxalic and tartaric acid. Direc-

tions for making the solution are given on page 9. Apply the solution with a brush or cloth and allow it to dry. Repeat the application if needed. To assure a finished effect, it is advisable to use the acid over the entire top of a table or desk and not over the spot alone. Wash off the acid with a weak ammonia solution followed by clear water, and allow the surface to dry for 24 hours.

When the wood has a gray, faded appearance, wash the entire piece with this mild bleaching solution to freshen the color. It is advisable to use a mask when sanding after this process.

If bad spots cannot be removed by bleaching, you may need to sand or scrape the wood slightly. Too much sanding, planing, or scraping injures the mellowness and richness of color and textures of the surface achieved from age and usage. This mellowness is known as "patina." Also, the new wood beneath will not be the same color as the rest of the piece that has not been scraped. Therefore, it is better to let an experienced person do this, with a warning against removing any more surface than is necessary. Not all finishers and cabinetmen appreciate and respect this beauty of the surface of the wood that comes only through age.

To remove dents or bruises

Remove dents or bruises by laying a damp woolen cloth over the spot and pressing it with a hot iron (figure 9). The warm moisture causes the wood to swell and to rise to its normal height.

To remove warp

The warping of a table top and leaves may be prevented largely by finishing both sides of the wood. An unfinished side is easily affected by hot air which dries out the moisture in the wood, and by moist air which swells the wood fibers.

In refinishing a warped table, you can remove and straighten the leaves and top if clamps are available, or you can take them to a cabinetmaker who has equipment to remove warp. The process is one of first moistening and swelling the pores of the wood on the concave side in which the moisture has dried out. Then when the boards are flat, clamp them in a flat position until they are dry. Moisture may be added in several ways; the boards may be steamed over a kettle; they may be thoroughly dampened and placed on a flat surface in the direct rays of the sun with the concave side down; or they may be covered with a 2-inch layer of wet sawdust until they are straight. In using sawdust, several boards may be straightened at the same time by piling them on top of each other with the sawdust between them and over the top. Place weights, such as bricks, on top and keep the sawdust wet. The straightening may take several days, and longer in cold weather.

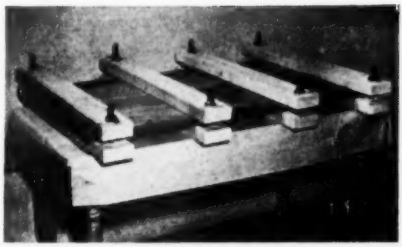

Figure 10. After table leaves have been straightened, put them under pressure in homemade clamps until thoroughly dry.

When the boards are straight, clamp them in a flat position. Homemade clamps for large boards may be made by using pairs of 2-by-4's with holes bored for ½-inch bolts. Each bolt should be fitted with a nut and 2 washers. Use enough clamps so that their centers are no more than 12 inches apart (figure 10). It is desirable to loosen the clamps two or three times a day to allow the wood to shrink evenly, otherwise there is danger of its splitting. If more than one board is placed in the clamps at the same time, leave air spaces for drying by placing at each clamp a narrow strip of wood between the boards.

To glue furniture

Joints may be repaired without taking the whole piece apart if the loose sections are sprung far enough apart to insert glue. Otherwise it may be necessary to pull out the legs, rungs, or other sections and reassemble them. If this cannot be done with the hands, give a sharp blow with a wooden mallet but first protect the finish with a soft piece of wood or with a pad of paper. A hammer, with the head covered by a rubber tip sold for canes, makes an excellent substitute for a mallet and will not injure the wood. Before you take the furniture apart, number all adjoining sections with corresponding numbers on the inside of the joints. Make small repairs on parts and dry them before you put the larger sections together.

The most satisfactory glue for the amateur is plastic resin, which comes in powder form to be mixed with water as needed. This glue is waterproof, does not stain the wood, and is easily handled.

Important steps in successful gluing. Scrape the old glue from both parts to be glued, so that the new glue can sink into the pores of the wood. If the surface is very smooth, slash it lightly with a knife. Hot vinegar will dissolve the glue quickly but then you must wait for the wood to dry before re-gluing.

Assemble all parts before gluing to see whether they need padding. If the joints fit loosely, do not depend upon the glue alone to hold them together; insert one or two strips of cloth to fill the extra space, or glue a piece of dowel into the hole and drill a new hole for the part to be inserted. Cut the cloth strips narrower than the dowel and, because they stretch when wet, cut them to extend only half the depth of the dowel (figure 11).

Warm the glue and, to open the pores, warm the wood by heating it

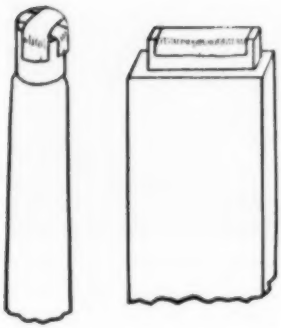

Figure 11. Use cloth strips to pad loose joints.

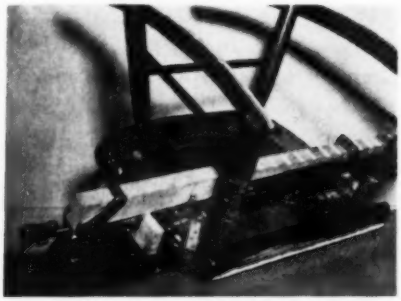

Figure 12. This broken seat has been glued and will be kept under pressure for 24 hours. Iron bands are added for greater strength.

slightly over a radiator, in the sun, or in the oven. Cold wood should never be glued.

Apply glue to both surfaces, and place them together. Immediately wipe off all extra glue that oozes from the joint.

Apply pressure by clamps (figure 12), or by using a heavy rope and sticks to make tourniquets (figure 13). If rope is used for the legs, place it only between the two legs to be tightened and not around the four legs. Always protect the wood or finish from damage by softwood pieces or by thick pads of paper between the clamps or ropes and the furniture. Keep the piece under pressure for 24 hours.

To glue small cracks. To repair a small crack near an edge, gently force it open with several softwood wedges. Drive one wedge in at a time until the opening is wide enough, then insert the glue with a thin stick or a small brush. Remove the wedges, and apply clamps to hold the parts together while the glue dries.

To replace veneer. To replace veneer, remove all old glue on both parts and apply the new glue to the base only. Put the piece of veneer in place and clamp it while drying as described below. Veneer may usually be obtained from a cabinetmaker. The new piece should, if possible, match both the grain and the color of the part next to the patch. Trim off irregularities in shape and cut the new piece exactly to fit.

To repair blisters. Make a slit with a sharp knife near the side of the blister where the glue still holds. To soften the old glue underneath so that the new glue may be absorbed by the pores of the wood, pour vinegar into the blister and allow it to stand for about eight hours. The wood must be thoroughly dry before the glue is inserted. A pad of paper and a block of softwood between the wood and the clamps insure even pressure and protect the wood against damage. Over a patch on a curve, use a sandbag as a weight (figure 14).

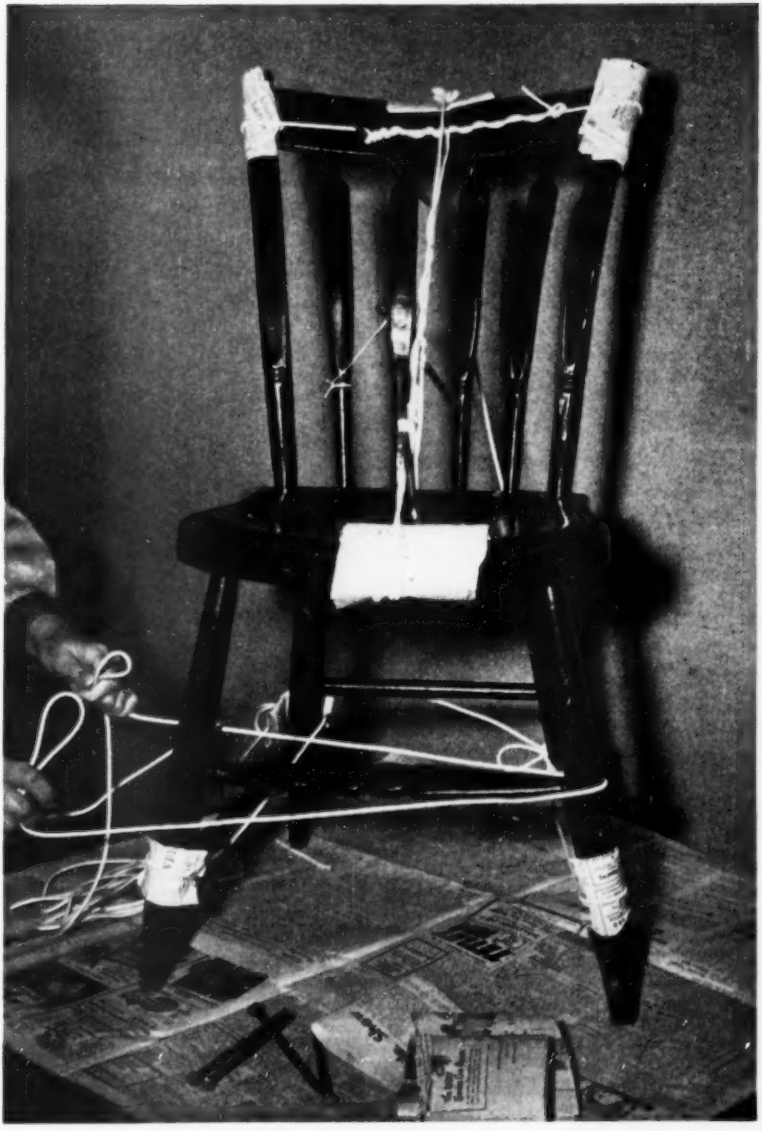

Figure 13. Here a clothesline and spikes for tourniquets are used instead of clamps to tie a chair that has been re-glued. The cord is placed to give pressure at each repaired joint. It is not necessary to cut the rope between two tyings; it can be looped as shown to form ends which are then tied in a square knot. Tie the cord loosely and then make it as tight as possible with the tourniquet. Use pads of newspaper to protect the wood, slipping them in place after the cord is tight enough to hold them.

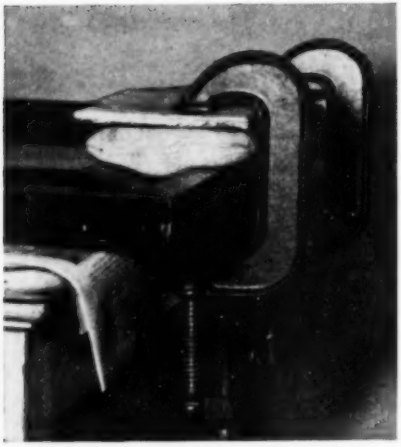

Figure 14. On a curved surface, a sandbag under the clamps adapts itself to fit both the curved mirror and the straight board.

Figure 15. Patches of wood show less if cut so that no edge is at right angles to the grain of the wood. The patches should be of old wood with grain and color that matches the surface to be repaired.

Figure 16. With a soldering iron, melt stick shellac over the hole to be filled.

To repair large areas

If the injured section on a piece of furniture to be finished with natural finish is so large that it cannot easily be filled by stick shellac, insert a piece of old wood that exactly matches the wood of the furniture and that has aged as the piece itself has aged. Cabinetmakers and finishers of old furniture collect old pieces of wood for this purpose. On some furniture a small piece of wood may be cut from the under part. To make the joining show less, cut these pieces diagonally so that no edge will be at a right angle to the grain of the wood (figure 15).

To fill small holes

Stick shellac. Small holes in furniture that is to have a natural finish are best filled with stick shellac. This is similar in character to sealing wax. It comes in many colors that match woods; but, as colors can be blended by mixing them as they melt, it is possible to match a variety of woods with only a few different colors. To blend two or three colors, hold the sticks together and move the soldering iron or hot knife around to mix the colors as they melt (figure 16). If the iron gets too hot, bubbles will form and as a result the finished surface will be full of holes.

A large hole may be filled partly with wood putty and only the top part filled with stick shellac. It is important to have enough depth to the hole to keep the shellac stick

from coming out after it is trimmed and sanded. It will come out if the hole is very shallow.

Many old holes have a dark edge that must be cut away before the hole is filled, or the edge will outline the repair and be noticeable. As the shellac stick melts, let the soft material drop into the hole or place it there with the point of the iron or knife. While filling the hole, stop occasionally and press the shellac down firmly with a wet finger. Build it up until the hole is not only filled but the patch is higher than the surrounding area. The shellac hardens quickly, so that the patch can be leveled at once. Use a short and very sharp blade, such as a penknife or a single-edged razor blade. Hold it flat and gradually shave off the raised portion until the patch is almost level with the wood. Then finish the smoothing with very fine garnet or silicon carbide paper. Use a hot knife to melt and smooth the surface when necessary.

Wood putty. Wood putty is a powder to be mixed with water as needed. It is especially good for patching wood that is to be painted. Use it underneath a layer of stick shellac when a hole is large or alone if you cannot get the stick shellac. If used alone, you will have to stain or paint it to match the adjoining wood. Cracks too small for stick shellac can be filled and treated this way.

To prevent the dry wood from absorbing the moisture from the putty as it is applied, slightly dampen the hole or crack with a cloth or small brush. As the putty may shrink a little as it dries, build it up higher than the surrounding surface and sand it off until level with the surface after it has dried.

It is more successful to color wood putty after it is dry than to color it with dry colors, as it tends to dry very light and not like a wood color. When dry, it may be colored with a mixture of oil colors to match the wood color and a little of the finish to set the color (page 18).

If you plan to stain the piece and to color the putty with stain, first paint the spot with a very thin mixture of your finish. You do this because the stained putty becomes darker than the wood. It is important to experiment first on sample spots. If the mixture is too thick, it fills the pores and the stain will not penetrate. Use stick shellac whenever possible because it is easier to match the color of the wood.

To sand a surface

Sanding is one of the most important parts of refinishing and must always be done thoroughly and with great care to prevent scratching the wood. Always sand with the grain of the wood and protect any section in which the grain goes in another direction, to prevent scratches that may

Figure 17. When sanding, protect the wood with opposite grain to prevent scratches.

never be removed (figure 17). The garnet finishing papers and the Series A, waterproof type, are superior to the flint type, formerly the only kind available. Emery cloth torn in strips is excellent to sand turnings and pierced designs (figure 18).

In sanding, use first as coarse a paper as the wood will stand without scratching, then finer ones until the surface is as smooth as the wood will become. The results vary with the kind of wood. A good sanding job is absolutely essential if the finished piece is to be successful. If the piece has been stained and will need to be stained again, sand only enough to get a smooth surface. Avoid rubbing the old stain off the edges.

For sanding large surfaces, a wood block is helpful. This should be made of softwood with a felt pad or a piece of rubber, such as is used for kneeling pads, glued to the base. The size, to fit a quarter-sheet of sanding paper, should be about 1 inch or 1¼ inches thick, 3 inches wide, and about 4½ inches long (figure 19).

The rubber pad alone is good to use with the sandpaper for some parts of the work; frequently the pad of the finger covered with a small piece of sandpaper is best of all.

If a block or pad is not used, fold a piece of the paper, cut to a convenient size, into thirds. Each third in turn can then be used and none of the paper is wasted. If the piece is to be stained, sand a section on the underside on which to try colors.

For wet sanding between coats of varnish, moisten the paper with soapy water. Rinse the surface with a cloth dipped in clear water and wipe dry. Pumice powder mixed with clear water can be used instead of the paper. Be sure to remove all the pumice from the crevices.

Figure 18. Strips of emery cloth make easy work of sanding turnings.

To Stain Wood

Woods such as mahogany, walnut, cherry, pine, and curly maple which have a natural beauty of pattern and color, should be finished to show these characteristics. No stain is needed unless a richer color is desired, or unless within the piece several kinds of wood, which were not planned for the purpose of effect, have been used. Any clear finish will darken the wood somewhat, but this natural richness of color is thought to add to its beauty.

Figure 19. A block of softwood with rubber from a kneeling pad glued to the underside is useful for sanding a large surface. The sandpaper is wrapped around the rubber side of the block.

You may need to add color to wood if it has no natural beauty of color in itself, if the color of the wood looks faded, or if there are several colors of wood in one piece and it is desirable to stain them to give a uniform appearance. If a penetrating wood sealer is used (page 26), it should be a colored one if that is available. A clear sealer may be colored (page 27). You can buy stains mixed, or may mix them yourself if you have the materials. If you do your own mixing, it is well to keep a record of the proportions used so that you can get exactly the same color if more is needed. Most amateurs will find it easier to buy commercial stains; they usually come in small-sized packages as well as large. It may be possible to get exactly the color you want with one kind of color, but if not, blend two or more colors in any proportion you desire. Do the mixing in the daytime when the light is good, for artificial light does not give true colors. Try a sample of the mixture on a sample of similar wood, or on an out-of-the-way place on the piece, to be sure that the color is satisfactory. When several colors of wood are found in one piece, the stain usually needs to be thinned for the darker portions so that all the wood will be the same color when finished.

General directions

Equipment. The stain and a brush or cloth to apply it; plenty of lintless cloths to remove the excess stain; gloves to protect the hands.

Method. Have the piece sanded and the holes filled and free from dust. After trying a sample of stain where it will not show, apply it to the surface and be careful not to let the brush strokes overlap. Leave the stain on the wood long enough for it to penetrate and to give the desired color. The longer the stain remains on the wood the darker will be the color, but it

must be wiped off before it has set so hard that the extra amount cannot be wiped off easily. A second coat may be needed if the first is not dark enough, but this should not be put on until the first has had time to dry. When the color is as desired, wipe off the rest of the stain and be sure that it is completely removed from the crevices. Leave the piece in a warm room for 24 hours or longer for the stain to dry completely before putting on further coats. *If the stain is not dry, other coats of finish will not dry.* When dry, sand the surface lightly to remove any roughness, but not hard enough to remove the color. Great care must be taken at the edges as the color is easily sanded off.

Type of stains and their use

Oil Stains. Oil stains are easy to use and usually are available. They are intended for soft woods that absorb stain readily; they have little effect on hard wood. Oil stains can be bought in many colors and in small quantities as well as in larger ones; but they are easily made if you have materials on hand and want to mix them at home.

To mix oil stains, add the desired colors to the following mixture: 3 parts of boiled linseed oil, 1 part of turpentine, and ½ part of Japan drier. The following oil pigments are suggested for the various stains:

Walnut:
4 parts Turkey burnt umber
1 part Vandyke brown

Cherry (dark):
Italian burnt sienna

Cherry (light):
2 parts Italian raw sienna
3 parts Italian burnt sienna

Mahogany (brown):
3 parts Italian burnt sienna
1 part rose pink
1 part Vandyke brown

Mahogany (red):
3 parts Italian burnt sienna
2 parts rose pink

Dark oak:
1 part Turkey burnt umber
4 parts Italian raw sienna

To be certain of an even coat on softwood, it is desirable but not absolutely necessary to apply first a coat of a mixture made of 3 parts of turpentine and 1 part of boiled linseed oil. If the wood has certain parts where the grain is open and porous, apply a *very* thin coat of white shellac to these parts before staining so that the color effect will be more uniform. Thin the shellac to at least from ⅕ to ⅛ of its regular strength with denatured alcohol; no gloss should show when the surface is dry.

Water stains. Good water stains are not available generally but they can be obtained. They give clear non-fading colors, are easy to mix and use, and are inexpensive. Because they do not bleed, they need no binder. They

are especially good for modern hardwood furniture that does not take an oil stain well. Care is needed to select truly natural colors of old woods. Some water stains have a raw and unnatural effect.

To make the stain, mix the dry powder with water just below the boiling point. Use distilled water if the local water is hard. Stir and cool before using. Dilute the stain with water to get lighter tones. Colors may be mixed together to get blends.

To prevent a too dark color on very soft wood and on end grains, wipe the wood first with a damp cloth. Apply the stain with a cloth or a brush. Place the furniture away from heat to dry slowly. When it is thoroughly dry, sand lightly.

Penetrating stains. These stains, often called *wood dyes,* are used on hard, close-grained woods that will not absorb an oil stain. They penetrate softwood quickly and deeply, making it almost black. Use a fairly dry brush; a full brush may make darker spots. The mahogany color has a tendency to bleed through any number of coats of finish.

Varnish stains. Colored varnish, which gives a surface color and a finish in one operation, is not too good; a better finish can be obtained by staining the wood first and then applying a harder and more "proof" finish. Varnish stain may be used, however, on inexpensive furniture of woods too hard to take an oil stain if a good water stain is not available. Varnish stains may be used to color penetrating wood sealer finishes, as they do not change the composition as much as do oil stains or oil colors.

Sealing stains. Some stains need a thin first coat of the finish to bind the stain. Thin shellac was formerly used as a binding coat under varnish. Today, this practice is not generally accepted. Because shellac and varnish do not expand and contract with weather changes at the same rate, there is greater danger that the finish will crack. Some modern stains seal themselves, as do the colored, penetrating, wood-sealer finishes. Water stains do not bleed.

Paste filler

Woods that have an open grain, such as oak, chestnut, ash, walnut, and mahogany, require a paste filler to fill the open pores and thus give a smooth, even surface. Paste filler usually comes in light or natural and can be colored to match woods by using colors in Japan, colors in oil, or dry colors (page 18). The color should be darker than desired because the paste filler will be lighter when dry. The thick paste filled should be thinned to a heavy liquid consistency before using. Apply it to the wood, preferably with an old, short-bristle, stiff brush, first in the *crosswise* direction of the grain and then, lightly *with* the grain.

For use beneath varnish: Thin paste filler with turpentine and apply it after the stain (if one is used) and before the first coat of varnish.

For use with a penetrating sealer type of finish: The paste filler *may* be applied after the stain is dry and *before* the finish is applied. This prevents the penetrating sealer finish from entering the wood as thoroughly as may be desired. Or it may be applied *after* the sealer finish has been applied and has passed the sticky stage, but before it has dried (usually within an hour). When used in this way, thin it with one-half turpentine and one-half sealer instead of all turpentine.

A good filler usually dries in from 15 to 20 minutes. When the gloss has disappeared and the filler looks flat, it has set hard enough to hold fast to the wood. Then wipe off what is left of the filler with a piece of burlap, first wiping crosswise of the grain then lightly with the grain. Take great care to do the wiping at exactly the right time; if too soon, the filler will be wiped out of the pores; if too late, it is hard to remove and sandpapering is necessary. For some work, a second and thinner coat may be needed to make a perfectly smooth surface. The filler should be covered with a thin coat of the same liquid used for the top coats unless the finish is a penetrating wood sealer which is usually thin enough for a first coat.

Application of the New Finish

Varnish Finish

A VARNISH finish is the most difficult for an amateur, but it is recommended for surfaces that must be absolutely waterproof. Unless a guaranteed penetrating sealer type of finish can be found, a "proof" varnish is worth the extra work. Three coats are needed to get a good finish. When buying varnish, read the labels carefully because they indicate when the product is proof against water, alcohol, heat, or acid. If you take care to avoid the difficulties of the varnish job, you can obtain satisfactory results. These requirements are important: *Never varnish in damp weather.* As far as possible, prevent dust particles from settling in the slow-drying varnish. This means, don't stir up dust by sweeping, and don't have much walking around. If you are working on a cement floor, wipe it with a damp mop. Cover your hair with a cloth or cap, and wear a clean cotton dress or work apron of a close weave instead of one that sheds dust, such as wool or any coarsely woven cloth. All sanding before varnishing must be done in another room, as must also dusting of the piece with a dry cloth or dusting brush. Use clean, fresh paper under your work. Just before varnishing, wipe the piece with a slightly sticky "tack rag" which picks up the fine particles that a dry cloth cannot possibly get.

Use a perfectly clean brush. The varnish too should be free from dirt and skin particles. Have the varnish warm, and work in a warm room (70°F.). Keep the piece in fresh air but not in a draft, and see that it is left to dry where there is good circulation of air to aid in the drying; a corner or the edge of a room is likely to contain dead air. Allow plenty of time for each

coat to dry thoroughly before rubbing it down; it is desirable to allow three days for the first coat, a week for the second, and as long as two weeks for the last. After the final oil rub, a piece should stand for several days to harden before it is used.

If the piece needs to be stained first, refer to page 17.

If a piece is open-grained and needs to have the pores filled before varnishing, refer to page 19.

Equipment: Varnish; a varnish brush; a cleaning fluid or a keeper for the brush; dry rags; a tack rag; a warm room as free from dust as is possible to get.

How to make a tack rag

A tack rag is a tacky cloth to be used just before varnishing to pick up the fine dust a dry one will not remove. It may be purchased commercially and will last a long time if it is not allowed to dry out. It should be kept in a covered jar small enough to prevent air from drying it.

To make a tack rag at home, take a piece of closely woven cheesecloth, and wash it several times. Then dip it in warm water, wring it out slightly to prevent drip, wet the cloth with turpentine, and shake it out loosely. Dribble varnish freely over the surface of the cloth, then fold and twist it into a tight roll to force out the water and to allow the varnish and turpentine to saturate the pores. Repeat the twisting a second time. Use enough varnish to make the cloth quite yellow. It should be sticky enough to pick up dust but dry enough not to leave moisture on the furniture. If it should dry out in the using sprinkle a few drops of turpentine and water over it. If it is too moist, shake it out in the air for a few minutes. Rough edges should always be folded inside as the cloth is used.

Preparation of varnish

Varnish should be warm so that it will spread smoothly and not show brush marks. In winter, if varnish has been chilled, keep it in a warm place for an hour or more before using it. When ready to use the varnish, pour out just the amount that will be used at one time, or for part of the work if the job is large. The dish into which you put the varnish must be clean. Place this dish into a larger one containing warm water so that the varnish will thin with the heat and will spread smoothly. When through, do not put any varnish back into the original can because it will have been affected by the air and may have collected some dust.

In closing a can of varnish, step on the cover to be sure that it is tight and then turn it upside down to prevent any air from getting in. As it is desirable to keep the air space in a can of varnish small to prevent thickening, keep changing it to a smaller container as you use it up. To remove the hard film that may develop on varnish that has been opened, take a

sharp knife and run around the edge to loosen it with a clean cut, then lift it out in one piece. If particles of dried varnish remain, the varnish must be strained.

To strain varnish, place a piece of thin material over the top of a clean container and hold it there with a cord or rubber band. A piece of nylon stocking is excellent because it is lintless and fine enough to prevent small particles from going through. Two thicknesses of cheesecloth or a piece of organdy may also be used.

Brushes

Figure 20. A varnish brush is wedge-shaped.

Selection of a brush. For good varnish work it is important to have a good brush, and if possible one that is made for that purpose. A dealer can help you to select the right kind for whatever type of work you may be doing. A good varnish brush is made with a "chiseled" shape (figure 20), that is, the bristles on the sides are short, so that there is a larger surface of the split ends or "flags." These flags hold the varnish and spread it more smoothly than does a brush with bristle ends all of one length. The width depends upon the kind of work to be done. For chairs, a 1-inch or 1½-inch brush is good; for large areas, a 3-inch or 4-inch brush is needed.

Care of a brush. A good brush will last for years if you take care of it, and good care is something that must be learned by anyone who wants to refinish furniture. A dirty brush always turns out poor work, and it is easy to get dirt on a brush. Therefore it takes care and effort to keep a brush in good condition.

A new brush, however good, almost always has a few loose hairs that should be removed before you use it. Rub the hand back and forth across the bristles. This also removes dust. It is also a good idea to wash a new brush in a cleaning fluid, such as carbon tetrachloride, which evaporates quickly and will not catch fire.

To clean a brush. All the varnish must be removed from the brush or it will harden in the bristles. Then the brush will never be free from little specks of the dried varnish that will get into new work. The brush may be cleaned in from three to five jars of cleaning fluid (figure 21), used one after the other, until the fluid is absolutely clean. Turpentine may be used for the cleaning, or if desired, carbon tetrachloride, which evaporates at once, for the last wash. The cleaning fluid should be kept in glass jars with covers that do not have rubber inside, because the rubber softens and drops into the liquid. Before you dip the brush into the cleaning fluid,

Figure 21. Keep numbered jars of turpentine for cleaning a brush. The last one may contain carbon tetrachloride instead of turpentine. When the brush is dry, wrap it in paper and store it on a flat surface.

wipe off any excess varnish with a cloth or brush it out on a piece of paper. When the brush is dry, wrap it in paper and store it on a flat surface.

To keep a brush for frequent use. If lard oil is available, dip the brush into the oil after cleaning it in turpentine. Then wrap the brush carefully in aluminum foil. When the brush is to be used again, the oil can be removed by washing the brush in turpentine. The lard oil will keep the bristles soft, and no varnish remaining in the top of the brush can dry to make trouble later.

Brushes that are used often may be suspended in a can or jar of liquid such as turpentine, raw linseed oil, or a mixture of the two. *Never* leave a brush in water because water takes away the natural springiness of the bristles and leaves them soft and flabby. Have the liquid deep enough to more than cover the bristles, and keep the tip of the brush 1 inch or more from the bottom of the jar. Make a hole in the handle through which to put a wire or nail (figure 22). When you take

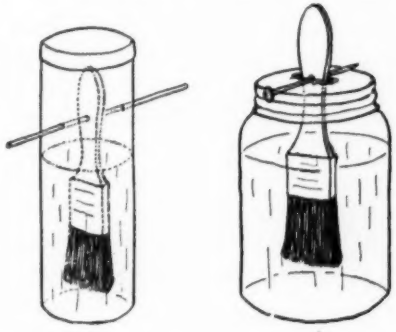

Figure 22. a. A tin cookie can tall enough for the brush to be enclosed makes a good "keeper." Bore holes through the can and the brush to permit the brush to hang without touching the bottom. *b.* A chisel-cut is made in the screw top of this jar, so that the brush can be put through it and air is kept out. A wire or nail through the brush handle holds the brush in position.

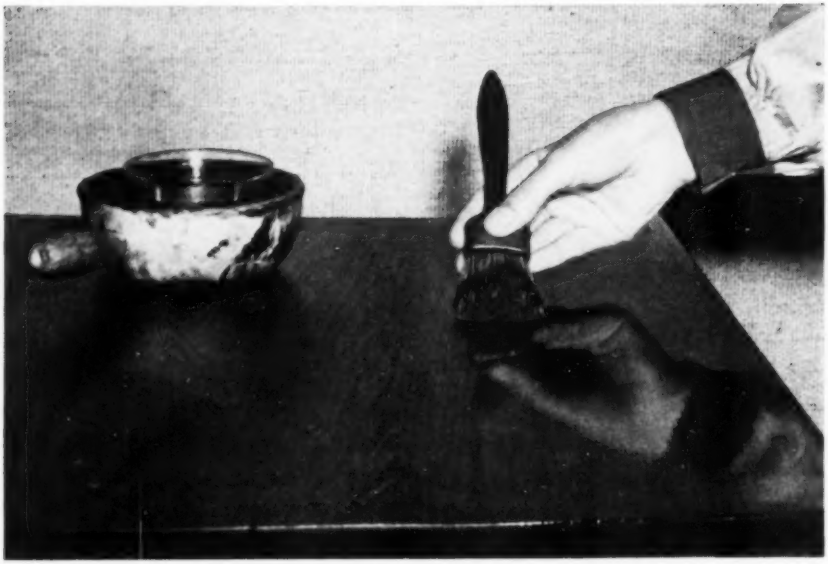

Figure 23. Hold the brush so that all of the tip ends of the bristles touch the surface. Keep the dish of varnish in warm water so that it remains thin and spreads smoothly.

the brush out, wipe it against the edge of the can, then brush out the liquid on paper. To be sure all the oil is out of the brush before starting to work, it is a good idea to dip the brush twice into varnish, each time brushing the liquid out again on paper.

Do not leave a brush in the air for longer than 20 minutes at a time, because air sets the varnish. When working for any length of time, put the brush back in the keeper for a while or clean it at intervals.

To use a brush. Before beginning work, dip the brush into the varnish and brush it back and forth on clean paper to get the varnish through the bristles evenly. Then fill the brush with varnish, scrape the excess from one side on the edge of the dish, and place the full side face down on the surface to be varnished. Spread a fairly thick coat over a small area brushing quickly both with the grain and across it to be sure there are no spots that are skipped. To get a drier brush for picking up the excess and "tipping off," wipe both sides of the brush against the edge of the dish. When laying on the varnish, hold the brush much as you do a pencil, and not high up on the handle (figure 23). Learn to use an easy wrist motion in applying the varnish, holding the brush at a low angle to permit all of the flag ends to leave the varnish they are holding. Do not use much pressure on the brush, because pressure causes bubbles to form in the varnish being applied.

Application of varnish

Varnish sets quickly, so work fast with long, even strokes rather than with short, choppy ones. Follow the lines of construction to apply and finish off the varnish. For turned parts, such as the leg of a chair or table, the strokes can go around the turnings; but on the long, plain sections, make your strokes lengthwise. If there is danger of the edge of a board scraping off varnish from a full brush as you start, stroke from the center outwards.

Lay on a thick coat over a section at a time, then dry the brush and brush across the entire length to pick up the excess varnish. Wipe the excess off on the edge of the dish. Continue over the varnished area, removing the excess varnish after each brush stroke.

Finally, "tip off" the surface to remove any bubbles. This is done by holding the brush straight up and down and lightly going over the surface with long strokes touching the surface only with the tip of the brush. After each tipping-off stroke, scrape off the varnish picked up so that the brush is always fairly dry. On a large area, where one stroke will not cover the distance, it is well to start the strokes at the edges and to end them at the center. Then there is less danger of the strokes showing where they join. For panels take a short stroke at each end and a long one in the middle.

Continue to lay on more varnish as described. Remove the excess, and tip off until the surface is covered. On an upright surface it is best to work on small areas at a time. Work from the unfinished to the finished section. Watch the upright sections for a few minutes. If the varnish starts to run, tip off the excess immediately.

To rub varnish coats

Equipment: 500-A waterproof paper; powdered pumice stone and rottenstone; water with a neutral white soap for lubricant; clear water; rubbing oil such as thin No. 10 motor oil, crude oil, thin mineral oil, or sewing machine oil; a felt pad such as a blackboard eraser, or layers of an old felt hat sewed together or tacked to a soft wood block; a 1-inch bristle brush for carvings or turnings; clean cloths, and a chamois.

After a coat of varnish is thoroughly dry, rub it to take off any dust particles, and to remove the high gloss so that the next coat can stick to it.

First and second coats. Sand the varnished surface with 500-A waterproof paper dipped into lukewarm, soapy water. Next wash the surface with a cloth dipped into clear water and dry it with clean dry cloths, or better, a chamois; or, first use pumice powder mixed with water, then clean it off, and dry the surface thoroughly. On a large surface, such as a table top, rub the ends first, and then, using a long stroke, rub the in-between area. The

Figure 24. The pads of the hand make good rubbing pads. Use a mixture of pumice powder and oil for hand rubbing.

piece should stand for several hours before the next coat is applied so that all dampness is dried out.

Third coat. Rub the third coat first with pumice powder and oil until the gloss has been cut so that there are no shiny spots nor any hard gloss seen underneath an apparently dulled surface. When you have achieved a uniform lustre that has depth and mellowness, allow a week for the finish to harden, then polish by rubbing surface with rottenstone and oil. This gives a special glow that is much desired and well worth the effort. Clean the surface thoroughly so that no oily film remains. A final cloth slightly dampened with carbon tetrachloride, the non-burning cleaning fluid, helps to remove the oil. Then give the piece a final polishing with a soft chamois or polishing cloth.

For hand rubbing (figure 24), mix the powder with the oil until the mixture is about as thin as light cream, and keep it stirred as it is used. When using a pad, keep the powder and the oil in separate dishes and dip the pad first into the oil and then into the powder (figure 25). Rub with the grain of the wood, and try to keep the amount of rubbing the same on all parts of the surface so that some parts will not be duller than others.

Penetrating Wood Sealers

In recent years a new type of finish for floors, woodwork, and furniture has come on the market and has taken the place of varnishing for much refinishing work. Penetrating wood-sealer finishes are easy to apply and to maintain. They seal the pores of the wood, and give a lustrous finish. Some are colored so that staining, sealing, and finishing can be done in one operation. They can be applied with a lintless cloth and, because they dry quickly, do not collect dust as does varnish. Also, because they penetrate into the pores more than does varnish, they do not scratch so easily. They are especially desirable for new wood because the sealer can get into the pores, but they can be used for old wood when all of the old finish has been removed.

Figure 25. Dip the felt eraser, for rubbing the final coat, first into rubbing oil and then into pumice powder.

Although sealers stand a great deal of wear, many are not proof against the hard treatment usually given a dining table. Some of the sealers now advertise high resistance to water, heat, and acids. Unless one of these sealers is available, a waterproof varnish should be used when a "proof" surface is desired. It may be used over undercoats of the sealer finish.

Penetrating sealer type finishes are available in three grades that range from the standard for average home use to the gym quality used for extremely hard service. Most sealers give a gloss finish that can be rubbed down to a satin finish as desired. Two or three coats are recommended for floors but four or more coats usually are used on furniture to build up a surface finish.

Most penetrating sealers are commonly available only in the clear finish, but some are made in such colors as oak, pine, maple, walnut, and mahogany. It is possible to get almost any color by having on hand a yellow brown (oak, pine, or maple) and the darker colors (walnut and mahogany). The color may be lightened by adding a clear sealer. Usually several kinds of pine and maple are offered in the store, and a choice can be made from the color card. A dark red mahogany is not available because the type of dye needed for this color has a tendency to bleed.

When colored sealers are not available, color may be added to a clear sealer, preferably by adding colors in Japan, dry colors, or colored varnishes. Oil colors may be used but are less desirable. If a dark color is desired, the piece should be stained first and then finished with the penetrating sealer.

Equipment and method

For close-grained woods

Equipment. Penetrating sealer; cloths without lint; No. 00 steel wool; pumice powder and rubbing oil (page 25).

Method. After the wood has been thoroughly sanded and repaired, dust it and apply the sealer with a cloth. If the sealer soaks into the wood at once, apply more so that the wood will take all it can hold at this time. Let the finish dry for 24 hours, then rub it evenly with fine steel wool. Apply a second coat, and, when this is dry, use steel wool again. Put on coats until you get the desired finish – a smooth even gloss over the entire surface, which means four or more coats for furniture.

To get a satin sheen on the surface, let the last coat dry for two days or longer to harden and season. Then rub the high gloss down to the desired lustre with fine steel wool and wax, or rub it down with pumice and oil as varnish is rubbed (page 25).

For open-grained woods

Equipment. Penetrating sealer; cloths without lint; No. 00, 000 or 2/0 and 3/0 steel wool; paste filler colored darker than wood; turpentine.

Method. The paste filler may be applied (page 19) either *before* the first finish coat is applied, as when varnish is used, or *after* the first coat has been applied but before it is dry. Using the filler *before* the first coat of finish is applied gives less penetration of the sealer finish but is often easier and the pores may be more completely filled. For deep penetration of the finish, the paste filler may be thinned with one-half turpentine and one-half sealer finish and applied after the sealer finish has passed the sticky stage, but before it has dried. This means that you should plan enough time to cover the entire piece with paste filler before you leave it.

Care and repair

The finish that penetrates into the pores of the wood does not show scratches as does a surface finish. If you wax the piece, you may need to replace the wax occasionally. If a worn spot appears, it can be repaired by applying some of the sealer. The patch will not show.

Waxing

The secret of good waxing is to let the finish first dry thoroughly to have it harden and season, then to use only thin coats of wax and buff each one well. If you use a thick coat of wax, the surface hardens but the under part remains soft. On floors, this often causes badly scuffed and dirty spots. It is important, too, that waxing be done in a warm room, for cold slows the hardening.

Waterproof waxes are now available. The hardest, most durable wax is made with a carnauba base instead of a beeswax or paraffin base. As

Figure 26. Place the wax between layers of cheesecloth.

Figure 27. Use a circular motion in spreading wax.

this information does not usually appear on the label, ask your dealer for the hardest wax of the carnauba type that he has. A paste wax or semi-paste wax gives a finish that lasts longer than does a liquid wax. It is desirable to color the wax with oil paint for dark colored woods so that a light film of the wax does not show. Burnt umber, Vandyke brown, or black for very dark woods may be used to color the wax.

To wax, first dust the piece. Then place a small amount of wax between several layers of cheesecloth (figure 26), and apply it with a circular motion (figure 27). Follow directions given for the length of time the wax should dry before it is polished. Usually it is suggested that it be polished before it has had time to get very hard. Otherwise it is difficult to polish evenly. Polish the surface with the grain of the wood, using a woolen cloth, a piece of wool carpet, or a grain bag. On flat surfaces a brick placed inside the cloth is helpful in getting a good polish (figure 28). Quick brisk action is important, such as a shoe-shine boy uses in polishing shoes. Re-wax occasionally.

Blond Finishes

The present popularity of blond furniture in simple designs, suggests the possibility of modernizing oak furniture. Dark, fumed oak finishes are almost impossible to remove, but the lighter oak finishes usually are bleached successfully.

For a blond finish, buy a commercial furniture bleach and follow directions carefully. Take special care to prevent the bleach from injuring your hands, clothes, or anything it

Figure 28. A brick wrapped in a piece of old wool carpet gives the weight and friction needed for buffing wax.

might touch. It may be necessary to make several applications on some woods. Rinse the piece thoroughly and let it dry for at least 24 hours in the open air.

The color tone can be obtained by painting on a colored coat and rubbing off the desired amount in a few minutes when it has just begun to set. The colored coat may be white firzite, white lead thinned with turpentine, or white enamel. These may be tinted with Japan or oil colors. Blond stains in various colors are also available.

Open pores should be filled with a paste filler tinted with the light color that was used on the surface. The final coats may be a penetrating sealer type of finish or a varnish.

Summary of Steps in Refinishing

Penetrating Sealer Type of Finish

Old Wood

Remove old finish
Glue, if necessary
Remove dents and old stains
Sand and dust

New Wood

Dampen, let dry
Sand and dust

For a dark color, a stain is necessary. If a light color is needed, color may be put in the sealer first, or it may be stained first. Let dry from 24 to 48 hours.
Sand lightly and dust.
Use paste filler if needed, colored darker than wood color. Let dry for 24 hours (or use alternate method, page 9).
Sand lightly and dust, using tack rag before sealer is applied.
First coat sealer. Add color if needed. Let dry for 24 hours.
Steel wool or sand lightly. Dust.
Fill holes with stick shellac.
Dust and use tack rag.
Second coat sealer. Let dry 24 to 48 hours.
Steel wool or sand lightly.
Dust and use tack rag.
Third and fourth coat sealer. Apply a third coat, and a fourth if needed, to get even lustre and a finish with enough body to give good service. Let dry for 1 week after last coat.
Rub with pumice and oil to get satin finish; let harden before using
OR
Steel wool lightly and wax.

Varnish Finish

Old Wood

Remove old finish
Glue, if necessary
Remove dents and old stains

New Wood

Dampen, let dry
Sand and dust

Sand and dust

Stain if needed. Dry thoroughly from 24 to 48 hours.
Use paste filler if needed. Dry for 24 hours.
Dust and use tack rag.
First coat varnish. Thin one-half with turpentine; dry from 24 to 48 hours.
Sand with 500-A silicon carbide paper or pumice powder and water.
Fill holes with stick shellac.
Dust and use tack rag.
Second coat varnish. Use full strength; dry for 48 hours.
Sand with 500-A silicon carbide paper or pumice and water.
Dust and use tack rag.
Third coat varnish. Use full strength; dry for 1 week.
Pumice and oil; let harden for 1 week.
Rottenstone and oil; let harden before using.

Blond Finish

Commercial bleach is needed to make a light base for blond finishes. It may have to be used several times. Some dyed wood, such as dark mission oak, may not respond to this treatment.

With Blond Stains

Remove old finish
Bleach
Remove dents
Stain

With White Firzite, White Lead, or White Paint

Remove old finish
Bleach
Remove dents
Apply white firzite, or white lead, thinned with turpentine, colored if needed. Enamel paints may also be used, thinned about one-fourth with penetrating sealer

Fill pores with paste filler if needed. Color filler by adding some of the stain, firzite, or paint, plus any tinting color that may have been added.
Sand lightly.
Dust. Use tack rag.
Apply first coat of finish, penetrating wood-sealer finish, or varnish thinned one-half with turpentine.
Fill holes with stick shellac or pumice powder mixed with varnish, colored slightly darker than needed when dry.
Sand and dust. Use tack rag.
Second coat finish.
Sand or steel wool and dust. Use tack rag.

Apply third coat; more if needed. After last coat let dry for 1 week.
Pumice and oil; let harden for 1 week.
Rottenstone and oil; let harden before using.

How to Recognize Some Common Woods

Walnut and *mahogany* have pores that are easily seen with the naked eye. These look like grooves or dark lines except on the end cut where they appear as tiny dots. Because wood shrinks as it gets older, the pores become smaller, and on old wood the lines are much finer than on newer wood. These two woods look much alike except that walnut is brown, mahogany is more red. The rich dark color of San Domingan mahogany was a favorite in the Chippendale period and again in the late Empire period. The mahogany of the Hepplewhite and Sheraton periods was of a lighter and browner color. Walnut was the favored wood of the Queen Anne period and later of the mid-Victorian and late-Victorian periods. Some of it is a reddish brown in color, and that known as black walnut is a cold brown.

Cherry and *mahogany* are often much the same in color, but in cherry the dark pore lines are either missing, or can be seen only slightly with the naked eye. Cherry has a fine hard texture. It is sometimes called "New England mahogany."

Rosewood, especially used in the better pieces of the early Victorian furniture, can be recognized by the black streaks running through it.

Gumwood is used with walnut in some modern furniture; they both have the same kind of brown color, and gumwood can be stained to look like walnut. But gumwood can be easily recognized because it does not show the dark lines of the pores as does walnut.

Birch, also found in modern furniture manufacture, is often stained a mahogany color, but it can be distinguished from mahogany because dark pore lines do not show. It is a very hard, fine-grained wood.

Soft white pine was the most common wood used by the early settlers for simple household furniture. Though light in color when new, it turns to a warm brownish yellow with age. It has a close, very fine grain.

Sugar maple, the wood most frequently used in the middle class furniture of New England in the early days, has a hard, smooth texture, and the pores cannot be seen without a lens. The color varies from very light in the outer sapwood to a reddish brown in the inner part of the log. The light sapwood was often used for inlay as a less expensive substitute for satinwood. "Curly" maple and "bird's-eye" maple come from trees in which irregularities in the fibre growth developed.

Whitewood, often in old inexpensive washstands, tables, and the inside of drawers, is a light, soft wood often streaked with a greenish color. It requires a stain.

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